

[54] RAILWAY PASSENGER VEHICLE UNDERFRAME CONSTRUCTION

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[51] Int. Cl. B61f 1/02

[58] Field of Search..... 105/416, 413, 396, 105/415, 417, 404

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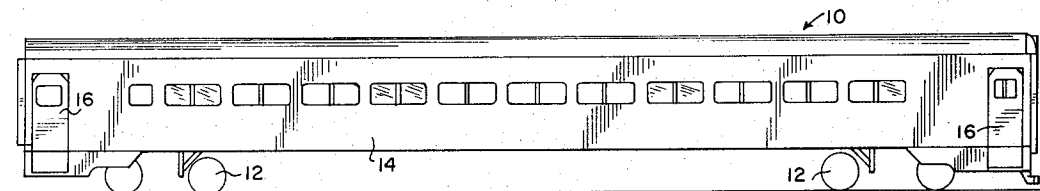
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[57] ABSTRACT

A multiple section center sill construction including a deep section structurally heavy draft sill unit and a shallower center sill member joined to the deeper draft sill to form a continuous sill unit extending the length of the passenger vehicle. A transition connecting plate means and seam reinforcing splicing plates are used to join the draft sill to the center sill to produce a draft sill and center sill wherein the cross section sizes correspond to the force requirements thereby lowering the weight of a vehicle by having sill members accurately sized and joined to resist the applied loads.

9 Claims, 9 Drawing Figures



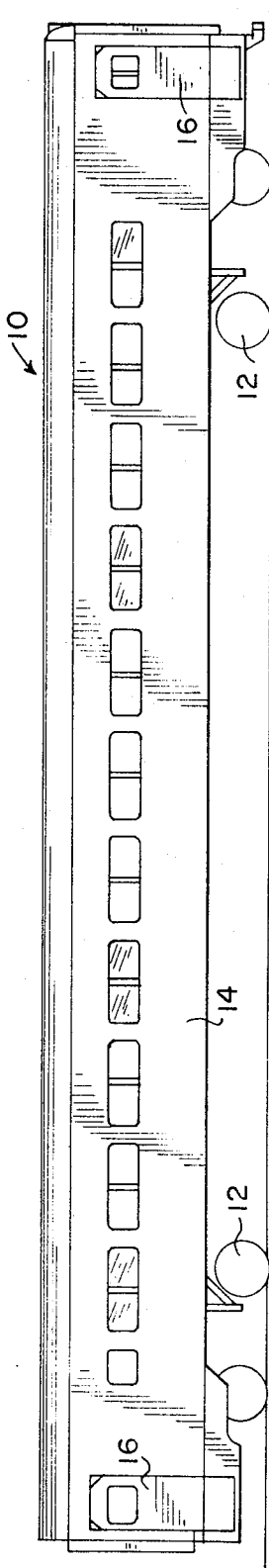


FIG. 1 -

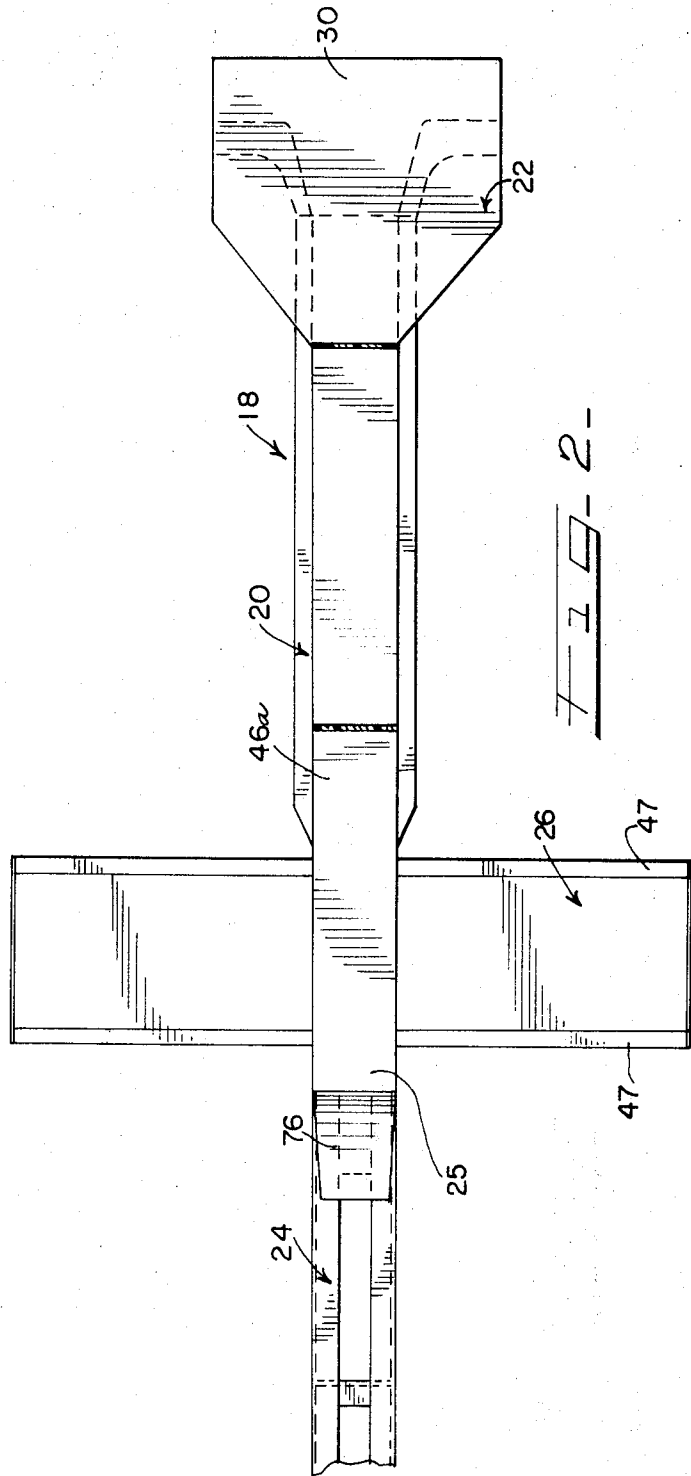
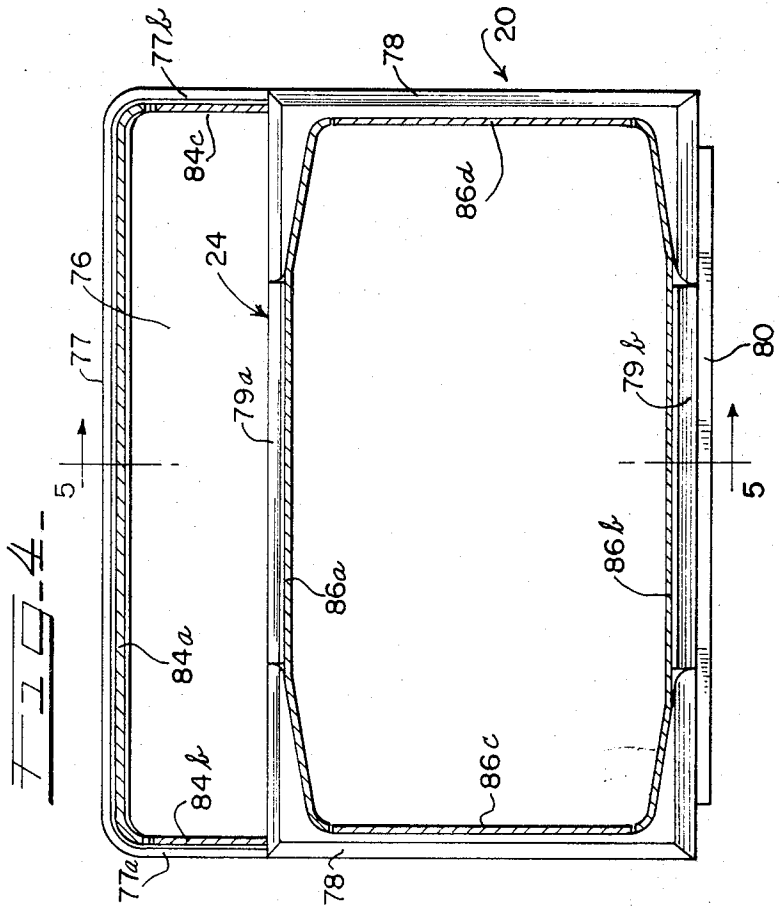
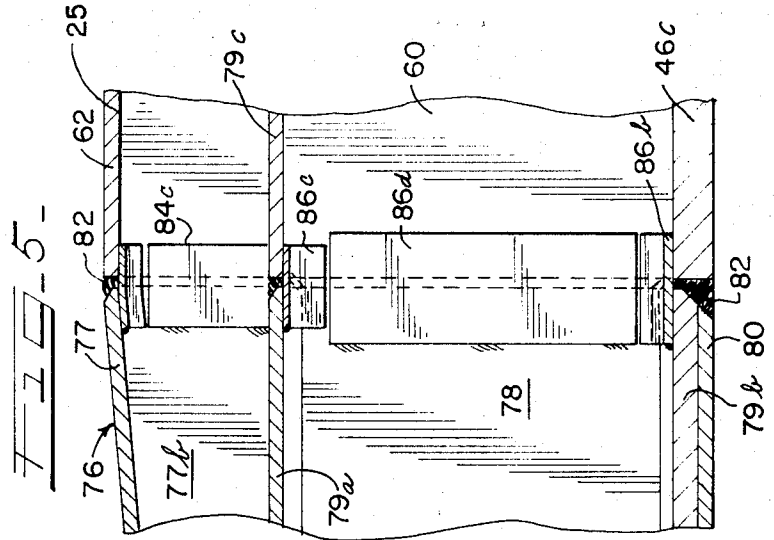
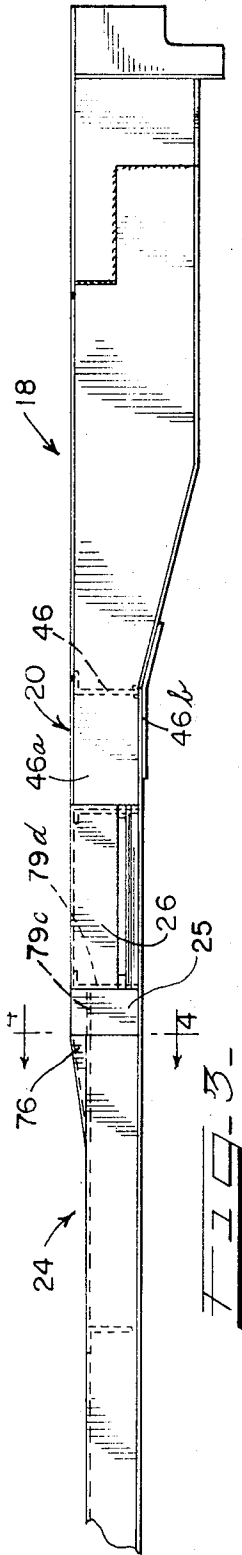
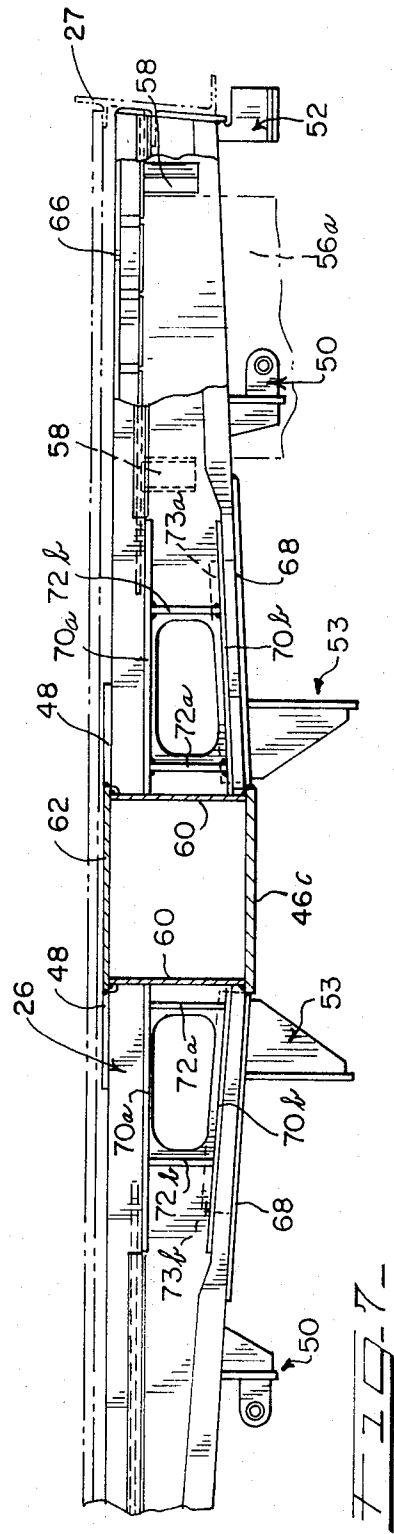
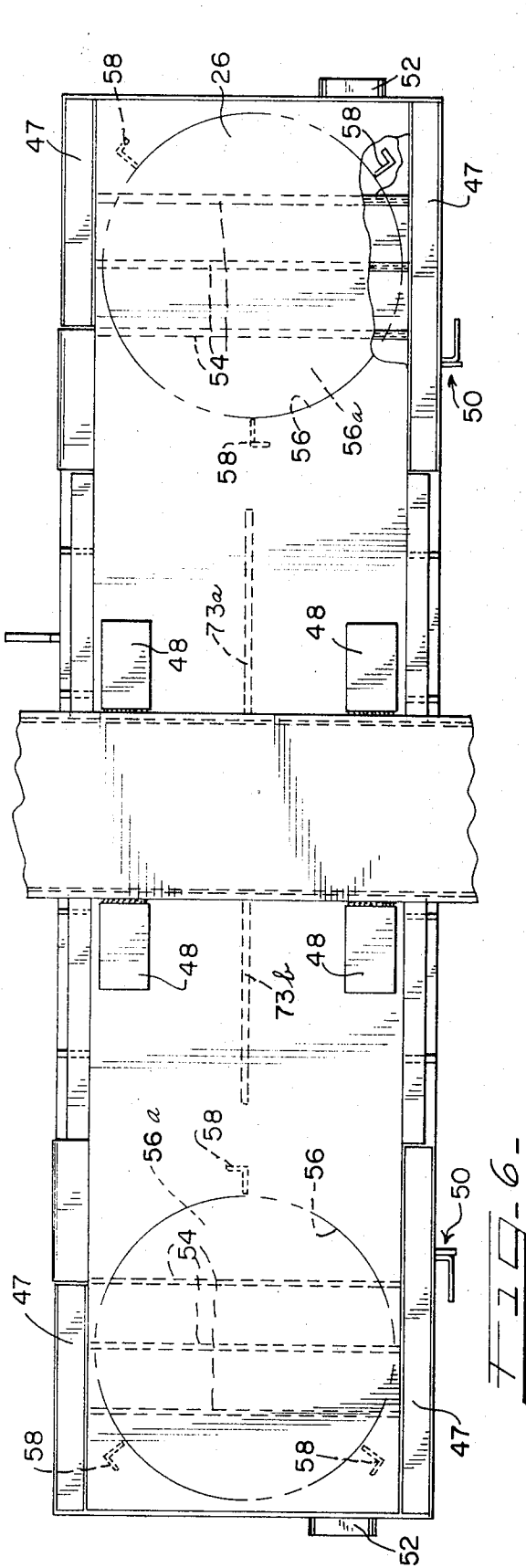
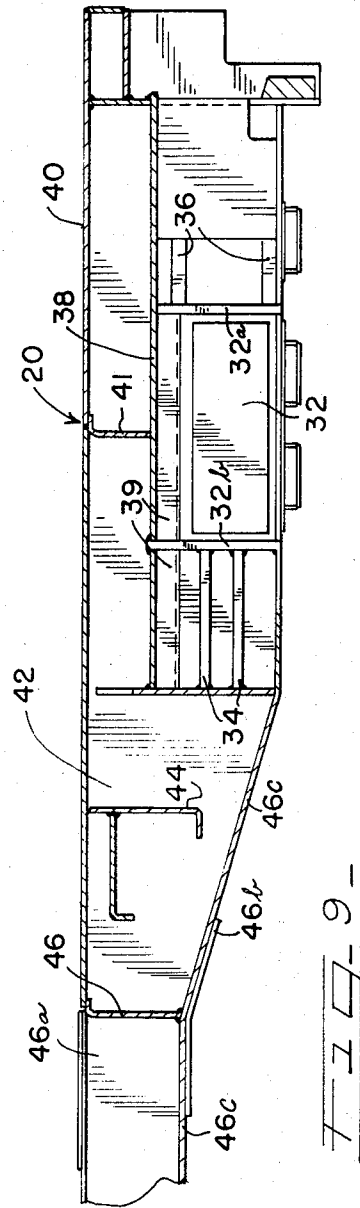
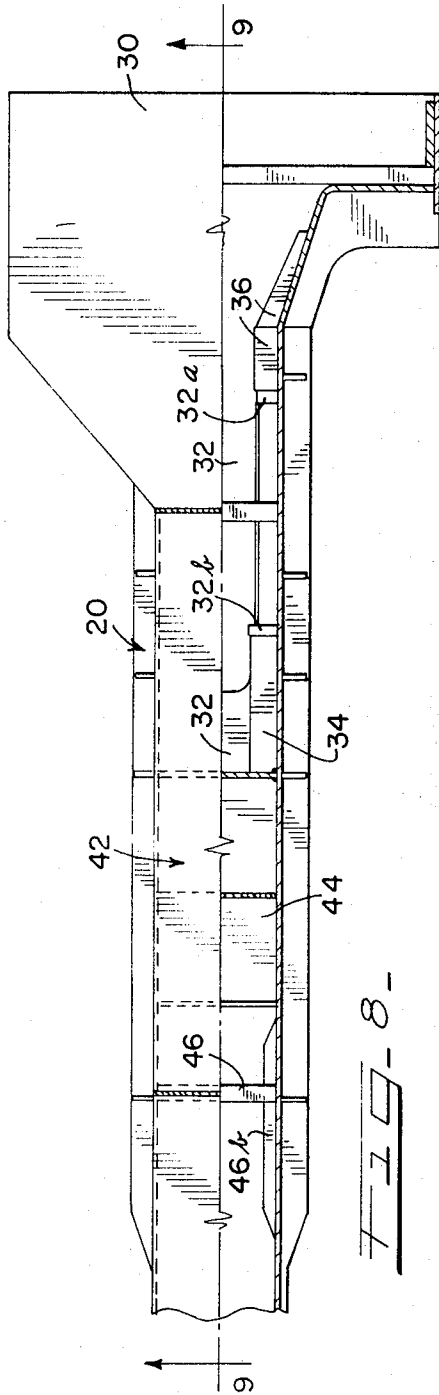


FIG. 2 -







RAILWAY PASSENGER VEHICLE UNDERFRAME CONSTRUCTION

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to railway passenger vehicle underframe constructions and in particular the center sill and draft sill units.

2. Description of the Prior Art

Prior art center sills have generally included a single piece continuous sill member extending the length of the vehicle between couplers. In the area between the bolster and the coupler where very high forces are encountered the center sill was generally reinforced by additional deep beam sections and various combinations of reinforcing plates and reinforcing flanges being added to the continuous sill member. On the other hand, between the bolsters, forces are absorbed by the two side sill members along with the continuous center sill so that a high strength center sill is not as necessary between the bolsters as is required between bolster and coupler. In the past, due to the necessity of attaching additional strength to the center sill the area between the coupler and the bolster, it was often necessary to add additional flange and plate parts to strengthen the center sill and to facilitate attachment of additional reinforcing members. It was also necessary to continue with the beam section for the length of the center sill since the center sill is a long continuous member and generally rolled as a single section generally as a hat-shaped or Z-shaped member. This practice produced a center sill section between the bolsters which possessed more strength than was required for its structural application in the portion between bolsters; consequently, the center sill could be too strong for any loads which would be applied to it thus adding additional unnecessary weight to the vehicle. This unnecessary weight has been eliminated in the present invention which provides a means of joining the draft sill section and the center sill section of a center sill assembly by a novel transition means which accommodates dissimilar center sill portions and draft sill portions to produce a center sill assembly which is of a reduced weight.

SUMMARY OF THE INVENTION

The present invention relates to a center sill assembly including a draft sill portion and a center sill portion connected by a novel transition means which permits connection of different sized beam members by use of a transition portion and by use of splicing plate members which surround the inside periphery of the seam between the different sized draft sill and center sill portions.

It is an object of the present invention to provide a railway passenger vehicle having an underframe including a center sill assembly having dissimilar sized beam portions connected by a transition cover plate reinforced by splicing plates welded around the seam connecting the two dissimilar size beams.

It is another object of the present invention to provide a railway vehicle underframe including a draft sill assembly having a deep beam portion and containing a draft gear and coupler assembly and supporting a transversely extending bolster member, said draft sill having a welded plate configuration and being joined by a transition plate assembly to a center sill member comprising a pair of spaced channel members.

These and other objects of the invention will become apparent from reference to the following description, attached drawings and appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side elevational view of a railway passenger vehicle;

FIG. 2 is a top plan view of the draft sill and bolster and a portion of the center sill of the railway vehicle underframe embodied in the vehicle illustrated in FIG. 1;

FIG. 3 is a side elevational view of the underframe portion illustrated in FIG. 2;

FIG. 4 is a sectional view taken along line 4—4 of FIG. 3;

FIG. 5 is a sectional view taken along line 5—5 of FIG. 4;

FIG. 6 is an enlarged top plan view of the bolster unit illustrated in FIG. 2;

FIG. 7 is an end view partially in section and with portions removed of the bolster illustrated in FIG. 6;

FIG. 8 is a top plan view partially in section of the draft sill portion of the present invention; and

FIG. 9 is a sectional view taken along line 9—9 of FIG. 8.

DESCRIPTION

The railway passenger car 10 illustrated in FIG. 1 rides on the usual spaced track assemblies 12 which support a body or vehicle unit 14 having longitudinally spaced doors 16. The underframe assembly 18 of the passenger car 10 includes the usual reinforced structural members which define a skeletal type of underframe assembly for supporting the car. The underframe assembly 18 includes a draft sill portion 20 which begins in the coupler area with an end sill portion 22 which provides a bell-shaped reinforced opening for positioning and movement of a coupler (not shown). Adjacent the draft sill 20 is a center sill member 24 which extends generally between the draft sill extension 25 and is connected to the draft sill 20. Extending transversely outwardly of the draft sill is a bolster member 26 which receives the vertical loading from the vehicle body 14. The bolster 26 provides a connection between the vehicle underframe and the side sills 27 of the vehicle and transfers longitudinal forces thereby from the draft sills to the side sills (see FIG. 7).

The draft sill unit 20 includes an end plate 30 which reinforces the end portion of the draft sill for receiving the coupler forces. As best illustrated in FIGS. 8 and 9, the draft sill unit 20 has a draft gear pocket 32 which houses a draft gear or other type of cushioning device to provide a capability for absorbing coupler forces. The draft gear pocket 32 includes the usual spaced lug portions 32a, 32b and extending longitudinally from the lug 32b are the usual reinforcing ribs 34 which transfer draft gear forces into the web of the draft sill. The front lugs 32a also are reinforced by rib members 36. A draft pocket cover plate 38 extends across the top of the draft pocket 32 between the webs of the draft sill and the cover plate 38 is reinforced by the L-shaped angle bars 39 which are welded into the corner between the top plate 38 and the web of the draft sill for reinforcement purposes. Vertically upwardly spaced from the cover plate 38 is a top flange portion 40 of the draft sill unit. A spacer and reinforcing bar 41 connects the cover plate 38 with the top plate 40.

Rearward of the draft pocket area of the draft sill is a funnel shaped section 42 which is best illustrated in FIG. 9. Positioned within this funnel section 42 is a transversely extending reinforcing beam 44 which strengthens the web of the draft sill and permits transmission of coupler forces through this narrowing area 42. A reinforcing and connecting plate 46 is positioned at the seam between the wedge-shaped transition portion 42 and the uniform center portion 46a. A bottom cover reinforcing bar 46b extends along each side of the bottom cover plate 46c of the draft sill unit.

Adjacent the center portion 46a is the bolster assembly 26 which is formed of a substantially hat-shaped cross section beam member and with the bottom open portion closed off by a cover plate to thereby form a box-shaped cross section. Flanges 47 extend laterally from the bolster to provide additional strength and also supply a mounting surface for various assemblies which are attached to the bolster at this point. Stress relief plates 48 are positioned at the corner between the bolster and the center sill member to provide additional reinforcement at these stressed areas. As best illustrated in FIG. 7 it is noticed that the bolster 26 includes a number of attachment points or brackets for attachment of shock absorber and other cushioning devices. A shock absorber mounting bracket 50 depends downwardly from the central portion of each part of the bolster and is used for attachment of shock absorbers to provide horizontal stability to the railway body. Additional shock absorber mounting brackets 52 provide a point of attachment of shock absorbers to provide vertical stability to the railway vehicle body and minimize the displacement between the vehicle body and the supporting truck. Leveling brackets 53 are spaced about the center sill and provide for attachment of leveling devices.

Extending across the bolster 26 at the end portions are a series of longitudinally extending reinforcing bars 54 best illustrated in FIG. 6. These reinforcing bars 54 support the top wall of a pocket 56 which surrounds an air bag 56a which supports and cushions the bolster on the truck 12. The air bag 56a is held in place by restraining brackets 58 which surround the periphery of the bag and prevent horizontal displacement.

As best illustrated in FIG. 7 it is noticed that the two part bolster assembly is fixedly attached to the center sill which is generally a box-shaped cross section having spaced wide web member 60 joined by a top cap plate 62 and a bottom cap plate 46c. The bolster is essentially a hat shaped welded plate construction having a top cover plate 66 and a bottom cover plate 68 and including a series of horizontally extending reinforcing bars 70a, 70b and interconnected vertically extending reinforcing bars 72a, 72b to thereby provide a rigid reinforced bolster for the passenger vehicle.

Rearward of both the bolster 26 and the draft sill extension 25 toward the center of the vehicle is the transition portion 76 as best illustrated in FIGS. 3, 4 and 5. As noted in FIG. 3, this transition portion is formed at the seam which joins the center sill 24 with the draft sill 20. A sloping transition member 76 is fixedly attached to the center sill member 24 and to the draft sill member 20. As illustrated in FIGS. 4 and 5 this transition member 76 includes a sloping top portion 77 and a pair of spaced leg members 77a, 77b extending downwardly to connect with the said channel members 78 of the center sill 24. Upper and lower cover and connecting

plates 79a and 79b, respectively, join the spaced side channel members to provide a box-shaped center sill unit. A bottom plate 80 extends across the center sill to further reinforce the center sill 24 and to match the thickness of the bottom portion of the center sill 24 with the bottom cover plate 46c of the draft sill unit 20. Connecting plate 79c abuts both plate 79a and separation plate member 79d.

As noted in FIG. 5 there is a continuous welded seam which connects the center sill unit 24 with the draft sill unit 20 and is designated generally by the numeral 82. The draft sill is connected to the center sill by abutting plate members which form extensions of the draft sill plate members and are fixedly welded to each other. As noted in FIG. 4, this seam 82 is further reinforced by splice plates such as 84a, 84b, 84c, which extend around the inner periphery of the transition member 76 to additionally reinforce the seam around the inner periphery of the connection. Within the periphery of the box-shaped section of the center sill assembly the seam is also reinforced by positioning of splice plates 86a, 86b, 86c and 86d around the inner periphery of the seam joining the draft sill 20 to the center sill 24. As noted in FIGS. 4 and 5, these splice plate portions conform to the outline of the mating members at the seam 82 and are welded into position to form a reinforced structurally sound connection and insure complete weld penetration.

It must be pointed out that in using this transition section, and the additional utilization of the splice plate at the seam, a novel method is provided for joining two different sized cross sections which also include different sized plate portions which are not easily joined by conventional methods of welding and joining and fastening. By having the ability to join different size cross sections by utilization of the transition section 77 and splice plates the underframe of the railway passenger vehicle may be provided with structural members which are more closely designed and appropriate and fitted to the structural roles which they must play. Rather than extending a very deep, heavy and strong draft sill the length of the car thereby providing strength in the center sill area which is not utilized because of lower loading forces which are brought to bear on the center sill in the area between the bolsters, it is now possible to provide a smaller cross section and one which is more closely related to the forces which it must support and thereby reduce the weight of the car.

The foregoing description and drawings merely explain and illustrate the invention and the invention is not limited thereto, except insofar as the appended claims are so limited, as those skilled in the art who have the disclosure before them will be able to make modifications and variations therein without departing from the scope of the invention.

What is claimed is:

1. A railway vehicle underframe having a center sill assembly comprising a shallow section center sill member and a deeper section draft sill member connected to and abutting said center sill member at a first seam portion and said vehicle also including car body bolsters and horizontally extending spaced side sill members, the improvement comprising a draft sill to center sill connecting arrangement having:

splice plate means reinforcing said seam and joining the abutting center sill member to the draft sill member;

a wedge-shaped transition member fixedly attached to the center sill member and to the draft sill member to provide for force transmission between the dissimilar section sizes;

said connecting arrangement positioned between each of said bolsters;

said center sill member including a box-shaped cross section comprising spaced channel members connected by a top cover plate and by a bottom cover plate;

said draft sill also having a box-shaped cross section between said bolsters and comprising transversely spaced side plate members connected by a top cap plate and by a bottom cap plate;

a connecting plate forming a continuation of said center sill top cover plate; and

a bolster separator plate extending transversely of said vehicle and forming an attaching means for the connecting plate.

2. The invention according to claim 1, and:

said wedge-shaped transition member being mounted on said center sill member and having a portion abutting the top cap plate of said draft sill and having depending leg portions abutting the top cover plate of said center sill member and the side plate members of the draft sill member;

reinforcing plate means positioned adjacent and in connecting relationship with the abutting portions of the transition members and the draft sill member.

3. The invention according to claim 1, and:

said reinforcing plate means having portions conforming with contour of the adjacent transition member and draft sill member to form a reinforced seam at the connection of the draft sill member and the transition member;

said reinforced seam forming a continuation of said first seam.

4. The invention according to claim 1, and:

the wedge-shaped transition member having a slop-

ing top portion extending between the top cover plate of the center sill member and the top cap plate of the draft sill member.

5. The invention according to claim 1, and said reinforcing plate means including reinforcing members fixedly attached to the inner periphery of the reinforced seam formed by the abutting transition portion and said draft sill member.

6. A railway passenger vehicle comprising body supported on an underframe assembly having a center sill and spaced longitudinally extending side sill members fixedly attached to transversely extending bolster units and said underframe comprising a coupler receiving and mounting draft sill member extending from a car end portion inwardly to the bolster unit and said draft sill having a draft sill extension protruding inwardly of the bolsters and in abutment with the center sill thereby forming a seam having an inner periphery and an outer periphery, the improvement comprising a center sill to draft sill connecting having:

reinforcing means fixedly attached on the inner periphery of said seam for strengthening same;

a reinforcing transition member positioned atop the center sill and having depending leg means attached to said center sill and having means attached to the draft sill extension to thereby provide for a reinforced connection between said center sill and the draft sill extension.

7. The invention according to claim 6, and:

said bolster unit having front and rear separation plates contained internally of the draft sill;

a connecting plate forming a continuation of said center sill and having a portion fixedly attached to said rear separation plate.

8. The invention according to claim 6, and:

said draft sill having a reinforced draft gear pocket vertically spaced from said center sill to draft sill connection.

9. The invention according to claim 6, and:

said reinforcing transition member including splice plate means fixedly attached thereto, and to the abutting draft sill extension.

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